

PATENT APPLN. NO. 10/594,459
AMENDMENT UNDER 37 C.F.R. §1.312

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IN THE CLAIMS:

1. (previously presented) A nonaqueous electrolyte secondary battery which has a positive electrode containing a positive active material, a negative electrode containing a negative active material and a nonaqueous electrolyte, said secondary battery being characterized in that said positive active material consists of a mixture of a lithium transition metal complex oxide A obtained by incorporating at least Zr and Mg into LiCoO_2 and a lithium transition metal complex oxide B having a layered structure and containing at least Ni and Mn as the transition metal.

2. (original) The nonaqueous electrolyte secondary battery as recited in claim 1, characterized in that said lithium transition metal complex oxide A is represented by the chemical formula:

$\text{Li}_a\text{Co}_{1-x-y-z}\text{Zr}_x\text{Mg}_y\text{M}_z\text{O}_2$ (in the formula, M is at least one element selected from Al, Ti and Sn, and a, x, y and z satisfy $0 \leq a \leq 1.1$, $x > 0$, $y > 0$, $z \geq 0$ and $0 < x + y + z \leq 0.03$).

3. (previously presented) The nonaqueous electrolyte secondary battery as recited in claim 1, characterized in that Zr contained in said lithium transition metal complex oxide A exists in the form

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of a compound adhered onto a surface of the lithium transition metal complex oxide A.

4. (original) The nonaqueous electrolyte secondary battery as recited in claim 3, characterized in that said Zr compound contained in said lithium transition metal complex oxide A exists in the form of particles adhered onto said surface of the lithium transition metal complex oxide A.

5. (previously presented) The nonaqueous electrolyte secondary battery as recited in claim 1, characterized in that said lithium transition metal complex oxide B is represented by the chemical formula: $\text{Li}_b\text{Mn}_s\text{Ni}_t\text{Co}_u\text{O}_2$ (in the formula, b, s, t and u satisfy $0 < b \leq 1.2$, $s + t + u = 1$, $0 < s \leq 0.5$, $0 < t \leq 0.5$ and $u \geq 0$).

6. (previously presented) The nonaqueous electrolyte secondary battery as recited in claim 1, characterized in that said lithium transition metal complex oxide B contains substantially the same amount by mole of Mn and Ni.

7. (previously presented) The nonaqueous electrolyte secondary battery as recited in claim 1, characterized in that said positive

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active material contains 51 - 90 % by weight of the lithium transition metal complex oxide A.

8. (previously presented) The nonaqueous electrolyte secondary battery as recited in claim 1, characterized in that said positive and negative active materials are contained such that, when a prescribed end-of-charge voltage is 4.3 V, a ratio in charge capacity of the negative to positive electrode is 1.0 - 1.2.

9. (previously presented) The nonaqueous electrolyte secondary battery as recited in claim 1, characterized in that said positive and negative active materials are contained such that, when a prescribed end-of-charge voltage is 4.4 V, a ratio in charge capacity of the negative to positive electrode is 1.0 - 1.2.

10. (previously presented) The nonaqueous electrolyte secondary battery as recited in claim 4, characterized in that said lithium transition metal complex oxide B is represented by the chemical formula: $\text{Li}_b\text{Mn}_s\text{Ni}_t\text{Co}_u\text{O}_2$ (in the formula, b, s, t and u satisfy $0 \leq b \leq 1.2$, $s + t + u = 1$, $0 < s \leq 0.5$, $0 < t \leq 0.5$ and $u \geq 0$).

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11. (previously presented) The nonaqueous electrolyte secondary battery as recited in claim 4, characterized in that said lithium transition metal complex oxide B contains substantially the same amount by mole of Mn and Ni.

12. (previously presented) The nonaqueous electrolyte secondary battery as recited in claim 4, characterized in that said positive active material contains 51 - 90 % by weight of the lithium transition metal complex oxide A.

13. (previously presented) The nonaqueous electrolyte secondary battery as recited in claim 4, characterized in that said positive and negative active materials are contained such that, when a prescribed end-of-charge voltage is 4.3 V, a ratio in charge capacity of the negative to positive electrode is 1.0 - 1.2.

14. (previously presented) The nonaqueous electrolyte secondary battery as recited in claim 4, characterized in that said positive and negative active materials are contained such that, when a prescribed end-of-charge voltage is 4.4 V, a ratio in charge capacity of the negative to positive electrode is 1.0 - 1.2.

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15. (previously presented) The nonaqueous electrolyte secondary battery as recited in claim 5, characterized in that said lithium transition metal complex oxide B contains substantially the same amount by mole of Mn and Ni.

16. (previously presented) The nonaqueous electrolyte secondary battery as recited in claim 5, characterized in that said positive active material contains 51 - 90 % by weight of the lithium transition metal complex oxide A.

17. (previously presented) The nonaqueous electrolyte secondary battery as recited in claim 5, characterized in that said positive and negative active materials are contained such that, when a prescribed end-of-charge voltage is 4.3 V, a ratio in charge capacity of the negative to positive electrode is 1.0 - 1.2.

18. (previously presented) The nonaqueous electrolyte secondary battery as recited in claim 5, characterized in that said positive and negative active materials are contained such that, when a prescribed end-of-charge voltage is 4.4 V, a ratio in charge capacity of the negative to positive electrode is 1.0 - 1.2.

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19. (currently amended) A nonaqueous electrolyte secondary battery which has a positive electrode containing a positive active material, a negative electrode containing a negative active material and a nonaqueous electrolyte, said secondary battery being characterized in that said positive active material consists of a mixture of a lithium transition metal complex oxide A obtained by incorporating at least Zr and Mg into LiCoO₂, and a lithium transition metal complex oxide B having a layered structure and containing at least Ni and Mn as the transition metal, the Zr contained in said lithium transition metal complex oxide A existing in the form of a compound adhered onto a surface of the lithium transition metal complex oxide A with at least 80% of the surface of said lithium transition metal complex oxide A being left exposed without being covered with said Zr compound.

20. (currently amended) A nonaqueous electrolyte secondary battery which has a positive electrode containing a positive active material, a negative electrode containing a negative active material and a nonaqueous electrolyte, said secondary battery being characterized in that said positive active material consists of a mixture of a lithium transition metal complex oxide A obtained by incorporating at least Zr and Mg into LiCoO₂, and a lithium

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transition metal complex oxide B having a layered structure and
containing at least Ni and Mn as the transition metal, the Zr
compound contained in said lithium transition metal complex oxide
A existing in the form of particles adhered onto said surface of
the lithium transition metal complex oxide A with at least 80% of
the surface of said lithium transition metal complex oxide A being
left exposed without being covered with said Zr compound.